DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the heat exchanger (56) must be shown or the feature(s) canceled from the claim(s). The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 56. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 1-3 are objected to because of the following informalities: in claim 1, a *first* heat exchanger (56) is claimed and in claim 3, a *first* heat exchanger (66) is also claimed. As these are different elements, applicant should use different nomenclature for consistency.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
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> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Anand et al (6,167,692) of the IDS. Anand et al teach a method of generating power from a pressure control station of a natural gas distribution system, comprising the steps of: channelling natural gas 28 entering the pressure control station into a turbine (34 or 40) which is powered by expansion of the natural gas as the pressure of the natural gas is reduced; and capturing the output of the turbine 36 or 48 for application for useful purposes; channelling natural gas exiting the turbine through a first heat exchanger 38 or 40 to extract cold temperature, accompanying the reduction in pressure, from the natural

gas *for use in one of refrigeration or air conditioning* [as applicant does not positively claim the refrigeration or air conditioning, the heat exchanger only has to be capable of use in such a system, and any of the heat exchangers 34 or 40 are clearly capable of such use]; the turbine being used to power an electrical generator 36 or 48 (col. 3, line 8).

5. Claims 1, 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Low (5,473,900). Low teaches a method of generating power from a pressure control station of a natural gas distribution system, comprising the steps of: channelling natural gas 16 entering the pressure control station (e.g. 90 which has Joule-Thompson expansion valves) into a turbine (18) which is powered by expansion of the natural gas as the pressure of the natural gas is reduced; and capturing the output of the turbine via a shaft for application for useful purposes; channelling natural gas exiting the turbine through a first heat exchanger 30 to extract cold temperature, accompanying the reduction in pressure, from the natural gas *for use in one of refrigeration or air conditioning* [see the cascade refrigeration loops 22]; the turbine 18 being used to power an electrical generator (see col. 4, lines 36-42).

6. Claims 1, 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Watson et al (7,272,932). Watson et al teach a method of generating power from a pressure control station of a natural gas distribution system, comprising the steps of: channelling natural gas 16 entering the pressure control station (e.g. col. 1, lines 27-30) which has Joule-Thompson expansion valves) into a turbine/expander (200, see Fig. 6) which is powered by expansion of the natural gas as the pressure of the natural gas is reduced; and

capturing the output of the turbine via a shaft for application for useful purposes; channelling natural gas exiting the turbine through a first heat exchanger HE4 to extract cold temperature, accompanying the reduction in pressure, from the natural gas *for use in one of refrigeration or air conditioning* [AC or Ice making]; the turbine/expander 200 being used to power an electrical generator (see Fig. 3, the step to the left of 100/200).

7. Claims 1, 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Salama (3,608,323). Salama teaches a method of generating power from a pressure control station of a natural gas distribution system (see col. 1, lines 25+), comprising the steps of: channelling natural gas 21, 37 (see Fig. 2) entering the pressure control station into a turbine (43) which is powered by expansion of the natural gas as the pressure of the natural gas is reduced; and capturing the output of the turbine via a shaft for application for useful purposes 45; channelling natural gas 47 exiting the turbine through a first heat exchanger 39 to extract cold temperature, accompanying the reduction in pressure, from the natural gas *for use in one of refrigeration or air conditioning* [see the indirect heat exchange with 51, 53 and refrigeration unit 33]; the turbine 18 being used to power an electrical generator (see col. 4, lines 36-42).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al (6,167,692) in view of Child et al (5,394,686) and optionally in view of any of Low, Watson and Salama. Anand et al teach a method of generating power from a pressure control station of a natural gas distribution system, comprising the steps of: channelling natural gas 28 entering the pressure control station into a turbine (34 or 40) which is powered by expansion of the natural gas as the pressure of the natural gas is reduced; and capturing the output of the turbine 36 or 48 for application for useful purposes; channelling natural gas exiting the turbine through a first heat exchanger 38 or 40 to extract cold temperature, accompanying the reduction in pressure, from the natural gas *for use in one of refrigeration or air conditioning* [as applicant does not positively claim the refrigeration or air conditioning, the heat exchanger only has to be capable of use in such a system, and any of the heat exchangers 34 or 40 are clearly capable of such use]; the turbine being used to power an electrical generator 36 or 48 (col. 3, line 8). Anand et al further teach using a portion of the natural gas 50 to power a gas fuelled turbine power generator (12), passing the exhaust gases from the gas fuelled turbine power generator (12) through a first heat exchanger (22) to preheat a fluid and then passing the fluid through a second heat exchanger (32) to preheat the natural gas being channelled into the turbine (34) and capturing the output of the gas fuelled turbine power generator 20 for application for useful purposes, note that the heat exchange loop is clearly shown

between 32 and 22. Anand et al do not teach making this heat exchange loop a liquid in the first and second heat exchangers. Child et al teach a natural gas turbine 183 and a gas turbine engine 125 where the exhaust from the gas turbine engine is recovered in exhaust gas cooler/second heat exchanger 129, where heat exchange loop 134 is used to heat the natural gas via heat exchanger 27. The heat exchange fluid is taught as being any heat exchange fluid, including brine or water (col. 12, lines 15+). It would have been obvious to one of ordinary skill in the art to employ a liquid heat exchange fluid which is liquid in both the first and second heat exchangers, as would be taught to one of ordinary skill in the art by Child et al, as an obvious matter of using the workable refrigerants known in the art. Anand et al do not explicitly use the first heat exchanger for use in refrigeration or air conditioning. However, as evidenced above by any of Low, Watson and Salama, this is very well known in the natural gas expansion turbine art. It would have been obvious to one of ordinary skill in the art to employ the first heat exchanger for use in refrigeration or air conditioning, as taught by any of Low, Watson and Salama, in order to employ a well known application for the cold energy still available after expansion and/or to prevent wasting the energy available after expansion.

10. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bertels (5,337,554 in view of any of any of Low, Watson and Salama and further in view of Child et al (5,394,686). Bertels teaches a method of generating power from a pressure control station of a natural gas distribution system 12, comprising the steps of: channelling natural gas 12 entering the pressure control station into a turbine (10) which

is powered by expansion of the natural gas as the pressure of the natural gas is reduced; and capturing the output of the turbine for application for useful purposes 11; using a portion of the natural gas 15 to power a gas fuelled turbine power generator (2), passing the exhaust gases from the gas fuelled turbine power generator (2) through a first heat exchanger (8) to preheat a fluid and then passing the fluid through a second heat exchanger (9) to preheat the natural gas being channelled into the turbine (10) and capturing the output of the gas fuelled turbine power generator 2 for application for useful purposes 3. Bertels do not teach channelling natural gas exiting the turbine through a first heat exchanger to extract cold temperature, accompanying the reduction in pressure, from the natural gas for use in one of refrigeration or air conditioning; the turbine being used to power an electrical generator. However, as evidenced above by any of Low, Watson and Salama, this is very well known in the natural gas expansion turbine art. It would have been obvious to one of ordinary skill in the art to employ a first heat exchanger for use in refrigeration or air conditioning, as taught by any of Low, Watson and Salama, in order to employ a well known application for the cold energy still available after expansion and/or to prevent wasting the energy available after expansion. Bertels does not teach the fluid in the first and second heat exchangers is a liquid. Child et al teach a natural gas turbine 183 and a gas turbine engine 125 where the exhaust from the gas turbine engine is recovered in exhaust gas cooler/second heat exchanger 129, where heat exchange loop 134 is used to heat the natural gas via heat exchanger 27. The heat exchange fluid is taught as being any heat exchange fluid, including brine or water

(col. 12, lines 15+). It would have been obvious to one of ordinary skill in the art to employ a liquid heat exchange fluid which is liquid in both the first and second heat exchangers, as would be taught to one of ordinary skill in the art by Child et al, as an obvious matter of using the workable refrigerants known in the art.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer, can be reached at 571-272-7118. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm

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